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FOR A FRAMEWORK CONVENTION ON CLIMATE CHANGE

EXECUTIVE SUMMARY OF THE NATIONAL COMMUNICATION OF

JAPAN

submitted under Articles 4 and 12
of the
United Nations Framework Convention on Climate Change

In accordance with decision 9/2 of the Committee, the interim secretariat is to make available, in the official languages of the United Nations, the executive summaries of the national communications submitted by Annex I Parties.

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JAPAN

Japanese Context

1. Japan is an archipelago stretching approximately from 24 degrees to 46 degrees north latitude. Its territory as of 1990 extends over 37,770,000 hectares, or about 0.3 percent of the earth's land area. Japan's population of about 123 million is 2.5 percent of the world population. Its gross domestic product was about \433 trillion (US$ 2,958 billion) in 1990. About 67 percent of Japan's land is covered by forests. Japan's climatic zones range from subtropical to subarctic, with four sharply distinct seasons. The long-term rate of increase in Japan's average annual temperature is currently estimated to be 0.9 degrees Celsius per 100 years.

2. Japan is dependent on foreign sources for most of the energy that produces the greater part of its carbon dioxide emissions. Though this dependence has been reduced somewhat by introducing oil substitutes in recent years, it remains slightly above 80 percent, leaving Japan highly exposed to the effects of supply fluctuations. Final energy consumption increased substantially throughout the period of rapid economic growth of the 1960s (during which real annual economic growth averaged 10.3 percent), but since the first oil crisis energy consumption has tended to remain level or to sink: the ratio of unit energy to unit GNP in fiscal 1990 was 36 percent less than in fiscal 1973. Japan's per capita energy consumption is therefore extremely low by advanced industrialized nations' standards, the equivalent of about 4,250 liters of oil per annum. Broken down, energy consumption was increasing considerably in the industrial, commercial/residential, and transport sectors of the economy until the first oil crisis; from 1973 until 1986, consumption tended to continue to increase in the commercial/residential and transport sectors, whereas consumption levels generally continued to decline in Japanese industry, which had accomplished a structural conversion to low energy consumption and the world's most advanced high-energy-efficiency technology. All three sectors tended to increase energy consumption as long as the economy remained strong after 1986; energy consumption continued to grow especially in the commercial/residential and transport sectors even after the economy began an adjustment phase in mid 1991, but in industry, it declined.

3. In short, although total emissions have continued to increase over the past few years, per capita carbon dioxide emissions are lower, thanks to Japan's generally temperate climate, relative geographical exiguity, and advanced economy, in addition to efforts to reduce energy consumption since the first oil crisis and greater resulting energy efficiency.

National Inventory of Greenhouse Gas Emissions and Removals

Basic Approach

4. This greenhouse gas emissions and removals inventory was compiled in accordance with the following approach based on the Guidelines for the Preparation of First Communications by Annex I Parties.

5. An inventory was compiled for emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O); and precursors: other nitrogen oxides (NOx), carbon monoxide (CO), and non-methane volatile organic compounds (NMVOC) during fiscal 1990 (April 1990-March 1991). Removals of carbon dioxide were also calculated.

6. Total greenhouse gas emissions and removals were calculated generally by the methods explained in the IPCC/OECD Draft Guidelines. That is, to quantify greenhouse gas emissions and removals in each sector, activity data on fuel consumption or other relevant values were multiplied by an emission factor for each gas emitting source and a removal factor for each sink. Significant figures were considered in the calculations. To calculate nitrogen oxide emissions, total measured nitrogen oxide emissions from all soot and smoke emitting facilities controlled under the Air Pollution Control Law were summed.

7. Currently, emission/removal factors and activity data needed to estimate emissions and removals are insufficient in certain categories. Improvement in these fields will be possible as more information is acquired and as international trends develop.

See table 2-1 contains Japan's fiscal 1990 greenhouse gas emissions and removals inventory on full communication. National inventory of greenhouse gas emissions and removals

Policies and Measures

8. In October 1990 the Japanese government established an Action Program To Arrest Global Warming by decision of the Council of Ministers for Global Environment Conservation. This Action Program spells out the government's current orientation in the short term and the general framework of enforceable measures that it should take in the future to promote planned and comprehensive measures against global warming; it also clarifies its basic approach toward obtaining the Japanese people's understanding and cooperation as well as contributions within the international framework. The Action Program is the national program of Japan provided for in Article 4 paragraph 1(b) of the United Nations Framework Convention on Climate Change.

9. The Action Program defines the formation of an environmentally sound society, the harmonization of environmental protection with stable economic development, and international coordination as "basic elements" of efforts to counteract global warming; it sets the year 2000 as its interim target year and the period until 2010 as its duration. Its targets are defined below:

(a) The Government of Japan, based on the common efforts of the major industrialized countries to limit CO_2 emissions, establishes the following target for the stabilization of Japan's CO_2 emissions.

- The emissions of CO_2 should be stabilized on a per capita basis in the year 2000 and beyond at about the same level as in 1990, by steadily implementing a wide range of measures under this Action Program, as they become feasible, through the utmost efforts by both the government and private sectors.

- Efforts should also be made, along with the measures above, to stabilize the total amount of CO_2 emission in the year 2000 and beyond at about the same level as in 1990, through progress in the development of innovative technologies, etc., including those related to solar, hydrogen and other new energies as well as fixation of CO_2 at the pace and in the scale greater than currently predicted.

(b) The emission of methane gas should not exceed the present level. To the extent possible, nitrous oxide and other greenhouse gases should not be increased.

10. With respect to sinks of CO_2, efforts should be made to work for the conservation and development of forests, greenery in urban areas and so forth in Japan and also to take steps to conserve and expand forests on a global scale, among others.

11. The Action Program also puts the following measures on the government agenda: measures to limit CO_2 emissions; measures to reduce the emissions of methane and other greenhouse gases; measures to enhance carbon dioxide sinks; promotion of scientific research and observation/ monitoring; the development and dissemination of technology and the promotion of public awareness; and international cooperation.

12. The Action Program's implementing framework consists of annual followup by the Council of Ministers for Global Environment Conservation to review progress toward implementation and the latest data on carbon dioxide emission levels.

13. The Council of Ministers has also decided to issue an appeal to the world community regarding the need for planning of long term vision to meet global warming ("The New Earth 21").

14. In November 1993 the Japanese Diet enacted the Basic Environment Law Japan's new law on the environment establishes as basic principles first, the enjoyment and perpetuation of the blessings of a healthy environment, second, the creation of a society ensuring sustainable development with reduced environmental load, and third, active promotion of global environmental conservation through international cooperation. It establishes a Basic Environment Plan in which the Action Program To Arrest Global Warming will be appropriately incorporated, it specifies measures that tne national government must take, including surveys and research related to economic measures, and it provides for international cooperation for global environmental protection.

Measures to Limit Carbon Dioxide Emissions

Industry

15. In industry, which accounts for about half of Japan's carbon dioxide emissions, the development of energy-saving technology has been promoted under the Energy Conservation Law since the first oil crisis; measures have been taken to improve and better apply standards related to the rationalization of fuel combustion and to assist investments in energy-saving capital equipment through special taxation measures and low-interest financing.

16. Through these measures, energy use has become more efficient, and marked improvements have been made in energy consumption per mining and industrial production unit. The major energy-saving investments are now already productive; the Energy Conservation Law was amended to effect further energy savings, and the Energy Conservation and Recycling Assistance Law, enacted in 1993, has radically strengthened policies by providing very low interest financing and other incentives for related capital investments.

17. Japan is also studying energy conservation measures aimed at the use of types of energy yet untried in agriculture, forestry and fisheries, and construction. The government is also urging manufacturers to set their own objectives for reducing carbon dioxide emissions.

Residential and commercial

18. Energy consumption is tending to rise in both the residential and the commercial/institutional sectors, due to advances in office automation and the wider use and growing capacity of electric home appliances. The following measures are being taken in the residential/commercial sector: i) standards related to insulation in construction are being improved and more strictly applied under the Energy Conservation Law and steps are being taken to assist builders through extra financing, etc., ii) Energy Conservation Law standards for home appliances, etc., are being strengthened and their scope expanded,

iii) the utilization of waste heat and other yet-unused forms of energy is being promoted through low-interest financing, etc., iv) demand for energy for cooling is being curbed through measures to mitigate the heat island phenomenon by planting more greenery in urban areas, and v) the planning of cities that emit little carbon dioxide is being promoted using subsidies from the national treasury and other means.

Transport

19. Motor vehicles account for a large and growing proportion of energy consumed to transport both passengers and freight. The following measures are therefore being directed at the transport sector: i) carbon dioxide emissions from motor vehicles are being curbed by setting and strengthening standards (as of 1993) related to gasoline engine passenger cars under the Energy Conservation Law and by using national treasury subsidies, special taxation measures, etc., to promote the introduction of low-emission vehicles, ii) the efficiency of freight transport is being increased by improving services and promoting the use of railway and coastal shipping using interest-free loans, special taxation measures, etc., and by promoting consolidated cargo transportation for intracity distribution, iii) the use of public means of transportation in passenger traffic is being promoted by increasing railway transport capacity and stimulating bus transportation, etc., and iv) transportation systems that generate less carbon dioxide are being created by improving transportation infrastructure to facilitate motor vehicle traffic based on the 11th Five-Year Road Improvement Plan (1993) and the 5th Specific National Five-Year-Project for Traffic Management Systems Installation (1991).

Energy conversion

20. In order to use energy more efficiently and to build an energy supply structure that generates little carbon dioxide, Japan is promoting the development of technology (for solar and other new and recycled forms of energy and fuel cells and other new supply systems based on the Basic Plan for Energy Research and Development); and intending to improve the efficiency of power generation by thermal power plants and to promote energy sources such as nuclear power, LNG, and hydropower that generate less or no carbon dioxide. Japan is taking measures to support development in these fields through low-interest financing and special taxation measures.

Cross-over sector

21. As measures to realize an environmentally protective lifestyle that overlap multiple sectors, Japan is setting goals, standards, etc., by Recycling Law, promoting recycling through various supportive measures, increasing awareness of environmental protection through the use of environmental marks, and promoting the use of more appropriate packaging.

Measures to Enhance Carbon Dioxide Sinks (Changes in Land Use and Forests)

22. Japan has long had a large percentage of forested land and has maintained this high percentage. Difficulties stemming from depressed wood prices, increased wood-product imports, etc. in the forest and wood industries are, however, visibly exerting effects on forestry management in some areas. Japan is therefore seeking i) to establish Forest Plans under the Forest Law and to promote planned forest conservation and improvement through the adequate management of Protection Forests, afforestation, and the thinning of forests, ii) to promote the effective use of wood resources, iii) to suitably protect forest that is a foundation for Japan's natural environment through such measures as the designation of nature conservation areas, and iv) to conserve and manage greenery in urban areas through a variety of beautification programs.

Measures to Reduce Methane Emissions

Waste management

23. About one-third of Japan's methane emissions is generated by waste landfills. Intermediate treatment and recycling are now reducing the volume of waste ultimately in landfills, but waste emissions are on the increase. The following measures are therefore being promoted to improve waste management: i) the Waste Treatment Law was amended in 1991 to encourage people to reduce and recycle waste, ii) treatment facilities are being constructed with the aim of reducing landfill volume, and iii) treatment plants are being converted to types that generate less methane. Japan is also taking steps to curb the consumption of fossil fuels through more efficient use of power generated from waste and other uses of heat from waste incineration.

Agriculture

24. Measures to reduce methane emissions in agriculture are still at the research stage; studies are underway to find ways to reduce the methane generated by rice cultivation and by livestock through enteric fermentation.

Energy Supply and Other Sectors

25. Efforts are being made to use the gas obtained during coal mining as fuel and legally to prohibit leaks during natural gas development and fugitive gas from gas works.

Measures to Reduce Nitrous Oxide Emissions

26. Japan is conducting surveys and research and developing technology with the object of quantitatively determining the amounts of nitrous oxide generated and emitted in

manufacturing, agriculture, and waste management and introducing measures to reduce emissions.

Measures to Reduce Emissions of Other Greenhouse Gases

27. Regulatory measures have been written into the Air Pollution Control Law to systematically deal with nitrogen oxides, carbon monoxide, and non-methane volatile organic carbons. The Japanese Government has established environmental standards for maximum levels of nitrogen oxides and carbon monoxide that should not be exceeded from the standpoint of protecting human health and has set concentration guidelines for the achievement of environmental standards for photochemical oxidants that in effect regulate levels of non-methane volatile organic carbons. Factory, workplace, and motor vehicle emission regulations are being enforced with regard to nitrogen oxides, and financing and special taxation measures are carried out to encourage the building of soot and smoke treatment facilities.

Promotion of Public Awareness

28. Japan has improved its environmental guidance in the Courses of Study (the Ministry of Education's official guidelines for teachers) in addition to promoting environmental protection, resource and energy conservation, and greening campaigns through public relations and the setting of campaign periods in newspapers and other media. In order to promote environmental protection activities by private organizations, a jointly funded government and private-sector Japan Fund for Global Environment was established in 1993. Finally, "Guidelines for Environmentally Sound Corporate Practices" and other manuals and guidelines are being drafted and distributed.

Scientific Research, Observation and Monitoring

29. Scientific research, observation and monitoring, and development of technology related to global environmental problems are being conducted in the framework of two plans: the annually drafted Comprehensive Promotion Program for Global Environment Research, Monitoring and Technology Development and a long-term plan, the Basic Plan for Research and Development Related to Earth Science and Technology (1990). The Comprehensive Global Environment Research Promotion Budget and others have been established to integrate and complement surveys and studies related to global environmental protection. In particular, Japan is promoting regionally extensive observation and monitoring, and surveys and research involving participation and tieups with international groups for planning of global environmental research, observation and monitoring.

Promotion of international cooperation (including funding & technology)

30. Harmony between the environment and development was stated to be one of the principles of ODA (Official Development Assistance) in the ODA Charter, adopted by the Cabinet in 1992. Based on the Prime Minister's announcement at the UNCED, Japan endeavors to significantly expand its ODA in the field of the environment to around \900 billion to \1 trillion during the five-year period starting from fiscal 1992. The Basic Environment Law also stipulates that Japan will promote international cooperation and other efforts directed at global environmental protection.

31. Specifically, Japan's contributions include $48.20 million (as of March 31, 1994) to the GEF core fund, human and budgetary contributions to the IPCC, the holding since 1991 of regular regional seminars to integrate promotion in the Asian-Pacific region of measures to arrest global warming and other comprehensive support for efforts to prevent global warming, the establishment of centers to provide information about environmental protection technology and transfers of energy-saving technology, support for the conservation and afforestation of tropical rain forests for the creation of carbon dioxide sinks, international cooperation to efficiently promote environmental and energy technology development, subsidies for NGOs, and support of private-sector international cooperation through the Japan Fund for the Global Environment.

Projections of the Effects of Greenhouse Gas Countermeasures

32. The projections of the effects of greenhouse gas countermeasures described here target the fiscal year 2000 (April 2000 to March 2001). The greenhouse gases considered in these projections are carbon dioxide, methane, and nitrous oxide. The Projection of the effect of measures to enhance greenhouse gas sinks target carbon dioxide.

Carbon Dioxide Emissions

Projection and evaluation of carbon dioxide emissions in fiscal 2000

33. Projections of "Energy (Fuel Combustion)" sector, which accounts for a large proportion of carbon dioxide emissions, are based on the energy supply and demand outlook for fiscal 2000 in the "Long-Term Energy Supply and Demand Outlook" published by the Advisory Committee for Energy. The "Outlook" is based on assumed economic growth rate and the price of oil (see the notes below) and assumptions that efforts by all concerned parties will ensure that all energy-conservation measures taken since fiscal 1990 and new energy-conservation measures foreseeable as of fiscal 1994 will make an expected contribution to lower carbon dioxide emissions.

34. Total carbon dioxide emissions in fiscal 2000 resulting from those existing and new energy-conservation measures taken into account in the Long-Term Energy Supply and Demand Outlook are estimated to be about 330 million tons of carbon (Table 3-1).

35. On a per capita basis, this indicates emissions of about 2.6 tons of carbon per year in fiscal 2000; compared with the level actually calculated in 1990 (2.59 tons of carbon per year), this means that the first target of the Action Program cited above is estimated to be achievable.

36. Yet greater efforts will be necessary, however, to achieve the Action Program's second target of maintaining total carbon dioxide emissions at the 1990 level, since total emissions are estimated to increase with respect to the fiscal 1990 total of 320 million tons of carbon.

Notes:

Economic growth rates:

For fiscal 1991-1994: actual rates through 1993 and from the Economic Outlook and Basic Policy Stance (1994).
For fiscal 1995-2000: 3.5% per annum, the rate assumed in the current economic plan "The Five-Year Economic Plan---Sharing a Better Quality of Life around the Globe."
(fiscal 1992-1996), and its exploitations.

Oil Price:

US$20 per barrel in fiscal 2000 (equivalent to current oil price in real term)

Projected effects of measures

37. If we compare totals based on the "Long-Term Energy Supply and Demand Outlook" assuming full compliance with energy-conservation measures with totals assuming no measures had been taken, it is estimated that overall these measures in fiscal 2000 will have an effect equivalent to approximately 30 million tons of carbon (about 120,000 Gg-CO_2). Without these measures, emissions will increase by approximately 10 million tons of carbon in each of the three subcategories under consideration: industry, commercial/residential, and transport.

38. In industrial process, it is estimated that a reduction in carbon dioxide emissions equivalent to about 2 million tons of carbon (7,000 Gg-CO_2) with respect to the 1990 level is possible by calcining less limestone in cement manufacture and so forth.

39. As for carbon dioxide emissions from waste, two municipal-waste scenarios were compared. The first assumes that no waste reduction measures are implemented and that the incineration ratio remains at the current level. The second assumes that municipal waste is reduced by 30% and that the incineration ratio continues to increase in line with past trends. Carbon dioxide emissions would be reduced by some 2 million tons of carbon (about 9,000 Gg-CO_2) in the second scenario as compared with the first.

Projected levels beyond 2000

40. Total carbon dioxide emissions are expected to stabilize at the 1990 level beyond the year 2000 through implementation of medium- and long-term energy measures. Japan intends to maintain measures in step with world opinion to curb carbon dioxide emissions.

Carbon Dioxide Removals

41. Projected carbon dioxide removals in fiscal 2000 based on the forest management goals in the Nation-wide Forest Plan (formulated every five years under the Forest Law) are approximately 25 million tons of carbon (about 92,000 Gg-CO_2), slightly better than in fiscal 1990.

42. It is necessary to continue to strive for better forest management to achieve the target of the Action Program To Arrest Global Warming: "With respect to sinks of CO_2, efforts should be made to work for the conservation and development of forests, greenery in urban areas and so forth in Japan and also to take steps to conserve and expand forests on a global scale, among others.

Methane (CH_4) Emissions

Projection and evaluation of methane emissions in fiscal 2000

43. It is estimated that total methane emissions will be about 1,150 Gg in fiscal 2000, given the expected effect of energy-conservation measures, measures to reduce municipal waste (Table 3-2) and so forth. This is less than the emissions measured in fiscal 1990 (1,380 Gg); hence the target established in the Action Program To Arrest Global Warming ("The emissions of methane gas should not exceed the present level") is estimated to be achievable.

Projected effects of measures

44. It is projected that methane emissions will be reduced by about 10 Gg with respect to 1990 levels by mining less coal.

45. Methane emissions from agriculture are expected to be about 100 Gg greater in fiscal 2000 than in fiscal 1990, judging from forecasts based on the "Long-Term Prospects for the Demand and Production of Agricultural Products" established in accordance with the "Agricultural Basic Law". It should be noted, however, that surveys are currently being conducted on farming method that will curb the generation of methane, and experimental research is being pursued with regard to fermentation treatment of animal wastes. Because it is difficult at this time to quantitatively project the effects of these efforts, however, they have not been included here.

46. As for methane emissions from waste, two municipal-waste scenarios were compared. The first assumes that no waste reduction measures are implemented and that the incineration ratio stays at the current level. The second assumes that municipal-waste is reduced by 30% and that the incineration ratio continues to increase in the line with past trends. Methane emissions would be reduced by some 470 Gg in the second scenario as compared with the first.

Nitrous Oxide (N_2O) Emissions

Projection and evaluation of nitrous oxide emissions in fiscal 2000

47. Total nitrous oxide emissions are estimated to be about 52 Gg in fiscal 2000, taking into account the effect of measures to save energy and reduce municipal waste (Table 3-3).

48. This is a slight increase with respect to the 1990 level (48 Gg); further efforts to accelerate development of technology to curb emissions and elucidate the mechanism of nitrous oxide emissions are necessary in order to achieve the Action Program's target, namely: "To the extent possible, the emissions of nitrous oxide and other greenhouse gases should not be increased."

Projected effects of measures

49. It is estimated that energy-conservation measures included in the Long-Term Energy Supply and Demand Outlook, if they are fully implemented, will effectively reduce nitrous oxide emissions in fiscal 2000 by about 2 Gg compared to the level that would be reached if no measures had been taken.

50. Nitrous oxide emissions from agriculture are estimated to be roughly at the same level in fiscal 2000 as they were in fiscal 1990, based on the forecasts using figures from the "Long-Term Prospects for the Demand and Production of Agricultural Products." The implementation of other measures to curb nitrous oxide emissions is planned, including promotion of the use of slow-release fertilizer, but they have not been taken into consideration here due to the difficulty of quantitatively projecting at the present time the effect these measures will have.